

SEQUENCE LISTING

<110> Dale, James B.

<120> GROUP A STREPTOCOCCAL VACCINES

<130> 481112.410

<140> US 09/151,409

<141> 1998-09-10

<150> US 60/058,635

<151> 1997-09-12

<160> 16

<170> PatentIn Ver. 2.0

<210> 1

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Product of Synthesis -- Primer, hybridizes to streptococcal type 24 M protein DNA

<400> 1

ggggggggcat cggtcgcgac taggtctcag acagat

36

<210> 2

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Product of Synthesis -- Primer, hybridizes to streptococcal type 24 M protein DNA

<400> 2

gggggggggat ccacgtagtt tctctttagc

30

<210> 3

<211> 30

<212> DNA

<213> Artificial Sequence

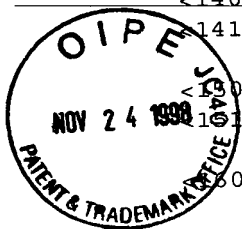
<220>

<223> Description of Artificial Sequence: Product of Synthesis -- Primer, hybridizes to streptococcal type 5 M protein DNA

<400> 3

gggggggggat ccgccgtgac taggggtaca

30



Sub B1

<210> 4
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 5 M protein DNA

<400> 4
gggggggtcg acctcagttt ttaacccttc 30

<210> 5
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 6 M protein DNA

<400> 5
gggggggtcg acagagtgtt tcctaggggg 30

<210> 6
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 6 M protein DNA

<400> 6
ggggggccat ggtaacttgt cattattagc 30

<210> 7
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 19 M protein DNA

<400> 7
ggggggccat ggagagtgcg ttatactagg 30

<210> 8
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 19 M protein DNA

<400> 8
ggggggctgc agagataact tctcattctg

30

<210> 9
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 1 M protein DNA

<400> 9
ggggggctgc agaacggtga tggtaatcct

30

<210> 10
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 1 M protein DNA

<400> 10
ggggggggta ccagctctct taaaatctct

30

<210> 11
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 3 M protein DNA

<400> 11
ggggggggta ccttgtaga tcagggtaca

30

<210> 12
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 3 M protein DNA

<400> 12
gggggggatcg atatttaact cttgtaacag

30

<210> 13
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 24 M protein DNA

<400> 13
gggggggatcg atgtcgcgac taggtctcag

30

<210> 14
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Product of
Synthesis -- Primer, hybridizes to streptococcal
type 24 M protein DNA

<400> 14
ggggggaagc ttttacttac gtgcctctaa ttc

33

<210> 15
<211> 1158
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Hexavalent M
fusion gene sequence constructed from
streptococcal type 24, 5, 6, 19, 1 and 3 M protein
DNAs

<220>
<221> CDS
<222> (1)..(1149)

<400> 15
gca tgc atg gtc gcg act agg tct cag aca gat act ctg gaa aaa gta 48
Ala Cys Met Val Ala Thr Arg Ser Gln Thr Asp Thr Leu Glu Lys Val

| 1 | 5 | 10 | 15 | |
|---|-----|-----|-----|-----|
| caa gaa cgt gct gac aag ttt gag ata gaa aac aat acg tta aaa ctt | | | | 96 |
| Gln Glu Arg Ala Asp Lys Phe Glu Ile Glu Asn Asn Thr Leu Lys Leu | | | | |
| | 20 | 25 | 30 | |
| aag aat agt gac tta agt ttt aat aat aaa gcg tta aaa gat cat aat | | | | 144 |
| Lys Asn Ser Asp Leu Ser Phe Asn Asn Lys Ala Leu Lys Asp His Asn | | | | |
| | 35 | 40 | 45 | |
| gat gag tta act gaa gag ttg agt aat gct aaa gag aaa cta cgt gga | | | | 192 |
| Asp Glu Leu Thr Glu Glu Leu Ser Asn Ala Lys Glu Lys Leu Arg Gly | | | | |
| | 50 | 55 | 60 | |
| tcc gcc gtg act agg ggt aca ata aat gac ccg caa aga gca aaa gaa | | | | 240 |
| Ser Ala Val Thr Arg Gly Thr Ile Asn Asp Pro Gln Arg Ala Lys Glu | | | | |
| | 65 | 70 | 75 | 80 |
| gct ctt gac aag tat gag cta gaa aac cat gac tta aaa act aag aat | | | | 288 |
| Ala Leu Asp Lys Tyr Glu Leu Glu Asn His Asp Leu Lys Thr Lys Asn | | | | |
| | 85 | 90 | 95 | |
| gaa ggg tta aaa act gag aat gaa ggg tta aaa act gag aat gaa ggg | | | | 336 |
| Glu Gly Leu Lys Thr Glu Asn Glu Gly Leu Lys Thr Glu Asn Glu Gly | | | | |
| | 100 | 105 | 110 | |
| tta aaa act gag aat gaa ggg tta aaa act gag gtc gac aga gtg ttt | | | | 384 |
| Leu Lys Thr Glu Asn Glu Gly Leu Lys Thr Glu Val Asp Arg Val Phe | | | | |
| | 115 | 120 | 125 | |
| cct agg ggg acg gta gaa aac ccg gac aaa gca cga gaa ctt ctt aac | | | | 432 |
| Pro Arg Gly Thr Val Glu Asn Pro Asp Lys Ala Arg Glu Leu Leu Asn | | | | |
| | 130 | 135 | 140 | |
| aag tat gac gta gag aac tct atg tta caa gct aat aat gac aag tta | | | | 480 |
| Lys Tyr Asp Val Glu Asn Ser Met Leu Gln Ala Asn Asn Asp Lys Leu | | | | |
| | 145 | 150 | 155 | 160 |
| cca tgg aga gtg cgt tat act agg cat acg cca gaa gat aag cta aaa | | | | 528 |
| Pro Trp Arg Val Arg Tyr Thr Arg His Thr Pro Glu Asp Lys Leu Lys | | | | |
| | 165 | 170 | 175 | |
| aaa att att gac gat ctt gac gca aaa gaa cat gaa tta caa caa cag | | | | 576 |
| Lys Ile Ile Asp Asp Leu Asp Ala Lys Glu His Glu Leu Gln Gln Gln | | | | |
| | 180 | 185 | 190 | |
| aat gag aag tta tct ctg cag aac ggt gat ggt aat cct agg gaa gtt | | | | 624 |
| Asn Glu Lys Leu Ser Leu Gln Asn Gly Asp Gly Asn Pro Arg Glu Val | | | | |
| | 195 | 200 | 205 | |
| ata gaa gat ctt gca gca aac aat ccc gca ata caa aat ata cgt tta | | | | 672 |
| Ile Glu Asp Leu Ala Ala Asn Asn Pro Ala Ile Gln Asn Ile Arg Leu | | | | |
| | 210 | 215 | 220 | |
| cgt cac gaa aac aag gac tta aaa gcg aga tta gag aat gca atg gaa | | | | 720 |
| Arg His Glu Asn Lys Asp Leu Lys Ala Arg Leu Glu Asn Ala Met Glu | | | | |
| | 225 | 230 | 235 | 240 |

gtt gca gga aga gat ttt aag aga gct ggt acc ttg tta gat cag gtt 768
 Val Ala Gly Arg Asp Phe Lys Arg Ala Gly Thr Leu Leu Asp Gln Val
 245 250 255

 aca caa tta tat act aaa cat aat agt aat tac caa caa tat aat gca 816
 Thr Gln Leu Tyr Thr Lys His Asn Ser Asn Tyr Gln Gln Tyr Asn Ala
 260 265 270

 eaa gct ggc aga ctt gac ctg aga caa aag gct gaa tat cta aaa ggc 864
 Gln Ala Gly Arg Leu Asp Leu Arg Gln Lys Ala Glu Tyr Leu Lys Gly
 275 280 285

 ctt aat gat tgg gct gag agg ctg tta caa gag tta aat atc gat gtc 912
 Leu Asn Asp Trp Ala Glu Arg Leu Leu Gln Glu Leu Asn Ile Asp Val
 290 295 300

 gcg act agg tct cag aca gat act ctg gaa aaa gta caa gaa cgt gct 960
 Ala Thr Arg Ser Gln Thr Asp Thr Leu Glu Lys Val Gln Glu Arg Ala
 305 310 315 320

 gac aag ttt gag ata gaa aac aat acg tta aaa ctt aag aat agt gac 1008
 Asp Lys Phe Glu Ile Glu Asn Asn Thr Leu Lys Leu Lys Asn Ser Asp
 325 330 335

 tta agt ttt aat aat aaa gcg tta aaa gat cat aat gat gag tta act 1056
 Leu Ser Phe Asn Asn Lys Ala Leu Lys Asp His Asn Asp Glu Leu Thr
 340 345 350

 gaa gag ttg agt aat gct aaa gag aaa cta cgt aaa aat gat aaa tca 1104
 Glu Glu Leu Ser Asn Ala Lys Glu Lys Leu Arg Lys Asn Asp Lys Ser
 355 360 365

 cta tct gaa aaa gct agt aaa att caa gaa tta gag gca cgt aag 1149
 Leu Ser Glu Lys Ala Ser Lys Ile Gln Glu Leu Glu Ala Arg Lys
 370 375 380

 taaaagctt 1158

<210> 16
 <211> 383
 <212> PRT
 <213> Artificial Sequence

<400> 16
 Ala Cys Met Val Ala Thr Arg Ser Gln Thr Asp Thr Leu Glu Lys Val
 1 5 10 15

 Gln Glu Arg Ala Asp Lys Phe Glu Ile Glu Asn Asn Thr Leu Lys Leu
 20 25 30

 Lys Asn Ser Asp Leu Ser Phe Asn Asn Lys Ala Leu Lys Asp His Asn
 35 40 45

 Asp Glu Leu Thr Glu Glu Leu Ser Asn Ala Lys Glu Lys Leu Arg Gly
 50 55 60

 Ser Ala Val Thr Arg Gly Thr Ile Asn Asp Pro Gln Arg Ala Lys Glu

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 65 | | 70 | | 75 | | 80 | | | | | | | | | |
| Ala | Leu | Asp | Lys | Tyr | Glu | Leu | Glu | Asn | His | Asp | Leu | Lys | Thr | Lys | Asn |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Glu | Gly | Leu | Lys | Thr | Glu | Asn | Glu | Gly | Leu | Lys | Thr | Glu | Asn | Glu | Gly |
| | | 100 | | | | | | 105 | | | | | 110 | | |
| Leu | Lys | Thr | Glu | Asn | Glu | Gly | Leu | Lys | Thr | Glu | Val | Asp | Arg | Val | Phe |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Pro | Arg | Gly | Thr | Val | Glu | Asn | Pro | Asp | Lys | Ala | Arg | Glu | Leu | Leu | Asn |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Lys | Tyr | Asp | Val | Glu | Asn | Ser | Met | Leu | Gln | Ala | Asn | Asn | Asp | Lys | Leu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Pro | Trp | Arg | Val | Arg | Tyr | Thr | Arg | His | Thr | Pro | Glu | Asp | Lys | Leu | Lys |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Lys | Ile | Ile | Asp | Asp | Leu | Asp | Ala | Lys | Glu | His | Glu | Leu | Gln | Gln | Gln |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Asn | Glu | Lys | Leu | Ser | Leu | Gln | Asn | Gly | Asp | Gly | Asn | Pro | Arg | Glu | Val |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Ile | Glu | Asp | Leu | Ala | Ala | Asn | Asn | Pro | Ala | Ile | Gln | Asn | Ile | Arg | Leu |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Arg | His | Glu | Asn | Lys | Asp | Leu | Lys | Ala | Arg | Leu | Glu | Asn | Ala | Met | Glu |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Val | Ala | Gly | Arg | Asp | Phe | Lys | Arg | Ala | Gly | Thr | Leu | Leu | Asp | Gln | Val |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Thr | Gln | Leu | Tyr | Thr | Lys | His | Asn | Ser | Asn | Tyr | Gln | Gln | Tyr | Asn | Ala |
| | | 260 | | | | | 265 | | | | | | 270 | | |
| Gln | Ala | Gly | Arg | Leu | Asp | Leu | Arg | Gln | Lys | Ala | Glu | Tyr | Leu | Lys | Gly |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Leu | Asn | Asp | Trp | Ala | Glu | Arg | Leu | Leu | Gln | Glu | Leu | Asn | Ile | Asp | Val |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Ala | Thr | Arg | Ser | Gln | Thr | Asp | Thr | Leu | Glu | Lys | Val | Gln | Glu | Arg | Ala |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Asp | Lys | Phe | Glu | Ile | Glu | Asn | Asn | Thr | Leu | Lys | Leu | Lys | Asn | Ser | Asp |
| | | | 325 | | | | | 330 | | | | | 335 | | |
| Leu | Ser | Phe | Asn | Asn | Lys | Ala | Leu | Lys | Asp | His | Asn | Asp | Glu | Leu | Thr |
| | | 340 | | | | | 345 | | | | | 350 | | | |
| Glu | Glu | Leu | Ser | Asn | Ala | Lys | Glu | Lys | Leu | Arg | Lys | Asn | Asp | Lys | Ser |
| | 355 | | | | | | 360 | | | | | 365 | | | |
| Leu | Ser | Glu | Lys | Ala | Ser | Lys | Ile | Gln | Glu | Leu | Glu | Ala | Arg | Lys | |
| | 370 | | | | | 375 | | | | | 380 | | | | |